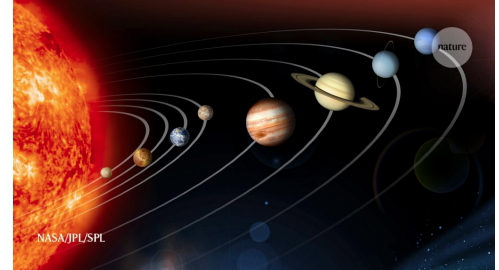


Centripetal Force

Background Information: Have you ever been on a rollercoaster that loops around? What keeps you from falling out of the cart?

You may be thinking that the safety belt is what keeps you intact. But think again. When you are going around the loop does your body press hard against the safety belt? It actually does not. This shows that there is another factor that keeps you from falling out of the cart. This other factor is called **centripetal force**.

Sometimes objects move in a curved or circular path. Centripetal force is the force that keeps the object moving in a circular path. It does this by pulling an object toward the center of a circle. Centripetal force that keeps the planets in orbit around the Sun, keeps the Moon in orbit around the Earth, and keeps roller coasters secure as they loop and curl.



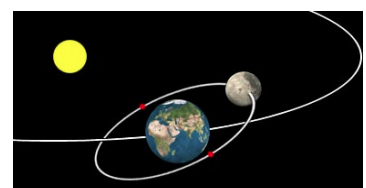
Video: Watch a NASA astronaut on board the International Space Station demonstrate centripetal force by swirling a tethered tool around a cord, rotating a bag of tea to demonstrate that the air bubbles are pushed toward the center, and spinning a water droplet to show its deformation based on centripetal force.

<https://mass.pbslearningmedia.org/resource/np11.sci.phys.maf.centripetal/teaching-from-space-centripetal-force/>

Challenge: Can you flip a cup of water upside-down over your head without getting soaked?

Materials:

- Disposable Plastic cup (transparent works best)
- Scissors or something to poke two small holes in the cup for string
- 4-5 feet of string
- Coin
- Water



Procedure:

1. Have an adult help you poke two small holes near the top of the rim. Position the holes across from each other.
2. Cut a piece of string about 4-5 feet long
3. Tightly tie one end of the string to each hole in the cup. Adding a piece of tape can help reinforce.
4. Place the coin in the cup. Now go outside or to an area that a parent approves.
5. Swing the cup in a full circle. Do this a few times to get the hang of it. If the coin falls out of the cup you are doing it wrong. When you want to stop swinging, make sure you do not stop abruptly. Swing the cup a few times and slowly bring the cup to a stop.
6. Now take the coin out of the cup and fill the cup halfway with water.
7. Swing the cup in a complete circle. If water spills out, you may not be swinging hard enough.

